

CLAIMS

This listing will replace all prior versions and listing of claims in the subject application.

1. (Previously Presented) A low-temperature process for producing pigment-grade rutile titanium dioxide from an aqueous solution comprising the following sequential steps:

- a. preparing an aqueous feed solution comprising a titanium compound;
- b. adding a catalyzing salt selected from two or more of NaCl, KCl, and LiCl to the solution in an amount from about 3% by weight of the equivalent amount of titanium dioxide to about the amount corresponding to the saturation point of the catalyzing salt in the feed solution, wherein the catalyzing salt does not significantly change chemical composition;
- c. optionally adding a chemical control agent to the solution;
- d. evaporating the solution to produce a dry amorphous intermediate that includes a mixture of titanium compounds; and
- e. calcining the intermediate to form TiO₂ phase pure rutile pigment base at a temperature greater than a melting point temperature of the catalyzing salt and for a period of time sufficient to melt the catalyzing salt.

2. (Original) The process of claim 1 further comprising washing the salt from the calcined TiO₂ rutile pigment base.

3. (Original) The process of claim 2 further comprising milling and dispersing the TiO₂ rutile pigment.

4. (Original) The process of claim 1 wherein the titanium compound is selected from the group of titanium chloride, titanium oxychloride, and mixtures thereof.

5. (Original) The process of claim 1 wherein the titanium compound is titanium oxychloride.

6. (Canceled)

7. (Canceled)

8. (Canceled)

9. (Currently Amended) The process of claim 1 wherein the catalyzing salt is a eutectic mixture of ~~two or more of~~ NaCl, KCl, and LiCl.

10. (Previously presented) The process of claim 1 wherein the catalyzing salt is a eutectic mixture of LiCl and KCl.

11. (Previously presented) The process of claim 1 wherein the catalyzing salt is a eutectic mixture of LiCl and NaCl.

12. (Canceled)

13. (Original) The process of claim 1 wherein the catalyzing salt present in the feed solution is from about 10 weight % and about 50 weight % of the equivalent amount of TiO₂ present in the feed solution.

14. (Original) The process of claim 1 wherein the amount of the catalyzing salt is between about 15 weight % and about 30 weight % of the equivalent amount of TiO₂ present in the feed solution.

15. (Original) The process of claim 1 wherein the catalyzing salt does not significantly chemically react with titanium oxide through the process.

16. (Canceled)

17. (Canceled)

18. (Canceled)

19. (Canceled)

20. (Original) The process of claim 1 wherein the calcining is conducted at a temperature less than 800°C.

21. (Original) The process of claim 1 wherein the calcining is conducted at a temperature less than 700°C.

22. (Original) The process of claim 1 wherein the calcining is conducted at a temperature less than 600°C.

23. (Original) The process of claim 1 wherein the calcining is conducted at a temperature less than 500°C.

24. (Original) The process of claim 1 wherein the calcining is conducted at a temperature less than 400°C.

25. (Original) The process of claim 1 wherein the calcination time is between the time needed to melt the catalyzing salt and about 24 h.

26. (Original) The process of claim 1 wherein the calcination time is less than about two hours.

27. (Original) The process of claim 1 wherein the calcination time is less than about 30 minutes.

28. (Original) The process of claim 1 wherein the calcination time for is less than about one minute.

29. (Original) The process of claim 1 wherein the chemical control agent is added before evaporating.

30. (Previously presented) The process of claim 29 wherein the chemical control agent is a tin compound.
31. (Previously presented) The process of claim 29 wherein the chemical control agent is tin chloride.
32. (Original) The process of claim 1 wherein the evaporating is conducted in a spray drier.
33. (Original) The process of claim 1 wherein the evaporation temperature is between about 100°C and about 300°C.
34. (Original) The process of claim 1 wherein the amorphous intermediate comprises a homogeneous mixture of titanium, oxygen, chlorine, and hydrogen compounds, with a homogeneous distribution of salts through the titanium intermediate.
35. (Original) The process of claim 32 wherein the product after calcination comprises TiO₂ rutile crystallites bound in a structure of hollow spheres or parts of spheres.
36. (Previously presented) The process of claim 35 wherein the spheres have a diameter of about 0.1 to about 100 µm.
37. (Canceled)
38. (Canceled)
39. (Canceled)
40. (Previously presented) The process of claim 2 wherein the washing is conducted with water to provide an aqueous salt solution and the TiO₂ rutile pigment base.

41. (Original) The process of claim 40 further comprising recycling the salts in the aqueous salt solution.

42. (Original) The process of claim 41 further comprising milling the washed TiO₂ rutile pigment base product.

43. (Original) The process of claim 1 wherein a thermodynamically unstable brookite phase is formed as an intermediate during the early stages of calcination.

44. (Previously presented) The process of claim 1 wherein the catalyzing salt is a eutectic mixture of NaCl, KCl, and LiCl.